SUMMARY OF 1989 GYPSY MOTH SUPPRESSION ACTIVITIES

WHITE OAK NAVAL SURFACE WARFARE CENTER

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USDA Forest Service
Morgantown, WV

Date: July 1989

SUMMARY OF 1989 SUPPRESSION ACTIVITIES

On Sunday, April 30, 1989, approximately 300 acres located at the White Oak Naval Surface Warfare Center were aerially treated to reduce gypsy moth populations and prevent defoliation. The treatment consisted of approximately 50 acres using Bacillus thuringiensis (B.t.) and 250 acres using Dimilin (diflubenzuron).

AGENCY CONTACTS

The project involved cooperation and coordination between three Federal agencies and the Contractor. The primary contacts and major participants are listed below.

Navy

Dr. Thomas Wray II
Natural Resources Manager
Naval Surface Warfare Center
Dahlgren, Virginia 22448

Chuck Hower
Public Works Contracts Division, Code W07
Naval Surface Warfare Center - White Oak
Silver Spring, Maryland

USDA Agricultural Research Station

Vic Miller
Chief of Farm Operations
USDA Agricultural Research Station
Beltsville, MD

USDA Forest Service

Bradley P. Onken
Forester
USDA Forest Service
Morgantown, WV

Rodney L. Whiteman
Biological Technician
USDA Forest Service
Morgantown, WV

East Coast Helicopter, Inc.

Richard Swiat
President/Pilot
East Coast Helicopter, Inc.
Gettysburg, PA

Dirk H. Dekker
Vice President/Pilot
East Coast Helicopter, Inc.
Gettysburg, PA

AGENCY RESPONSIBILITIES

Navy

The project was planned and contracted by the Navy. Specific responsibilities included selection of the treatment areas, insecticide and method of application; contract development, implementation, and management; preparation of environmental documents; public and employee notification; and project coordination and supervision.

USDA Agricultural Research Station

The primary mixing and loading site used during the NSWC spray project was provided by the Beltsville Agricultural Research Station (ARS). Specific responsibilities included selection of an appropriate LZ and coordination with station security police for weekend and after hour access to the area.

USDA Forest Service

The Forest Service acted in the capacity of a technical consultant to the Navy. As such, the Forest Service participated in the contract development and other planning activities including: preparation of a site specific environmental assessment; coordination with Navy to develop pre-treatment monitoring of egg hatch, larval development and foliage expansion; inspection, calibration and characterization of the aircraft and spray equipment; monitoring of meterological conditions and maintenance of mixing/loading records; provided communication systems between LZ, treatment block and spray aircraft; and assisted in treatment block monitoring and demarcation. The Forest Service also provided reimbursement to the Navy for the costs associated with the treatment.

East Coast Helicopter, Inc.

The contractor provided an FAA approved spray aircraft in advance of the treatment date for calibration and characterization; insecticide; mixing and loading equipment and sufficient personnel to operate them. The primary responsibility of the contractor was to provide a quality and efficacious application to the target areas.

OPERATIONAL ASPECTS

Insecticides

An emulsifiable suspension formulation of Bacillus thuringiensis (B.t.), Dipel® 8L, was applied at the rate of 16 Billion International Units (BIU's) in 128 ounces of total mix per acre. The mixing recipe was as follows: 32 ounces Dipel 8L, 2.5 ounces Bond® sticker and 93.5 ounces water. Enough material was mixed to treat 50 acres at the NSWC. The mixing was conducted at the Montgomery County Airpark shortly before application.

A wettable powder formulation of diflubenzuron, Dimilin® 25W, was applied at the rate of 2 ounces in a total formulation of 128 ounces per acre. The mixing recipe was as follows: 2 ounces of Dimilin (0.03 lbs. a.i.) and 128 ounces of water. The batch mix included enough material to treat 250 acres at the NSWC. The mixing and loading was conducted at the primary LZ located on the South Farm at ARS.

Application Data and Weather Conditions

The application of both B.t. and Dimilin was conducted in the afternoon on April 30, 1989. Fifty gallons of B.t. were loaded into the aircraft at the Montgomery County Airpark and applied at the NSWC at approximately 2:30 PM. The ferry and application time was about 45 minutes. The conditions during the treatment were good. Temperature was 77°F, relative humidity 67 percent, and winds were from the southeast at 0-2 miles per hour.

The first sortie of the Dimilin application was conducted at 3:45 PM and was staged from the Beltsville Agricultural Research Station. A total of 4 sorties was conducted and the treatment was completed at 5:42 PM. Weather conditions during the application were good. Temperature ranged from 75-76°F, relatve humidity between 59-61 percent, and winds out of the southeast at 0-2 miles per hour. Average production rate during the Dimilin application was about 128 acres per hour. Example 1 in the appendix shows the completed sortie report form used during the treatment.

Treatment Area Marking

Spray blocks were deliniated on color infra-red, 1:12000 scale aerial photographs and given to the pilot prior to the treatment at NSWC. Two white helium-filled balloons were deployed to mark the southern portion of the spray block (Figure 1).

Communications

Forest Service radios were used to communicate between the staging area, the spray blocks, and the spray aircraft. The contractor provided his own radios for communication between the spray aircraft and the mixing and loading crews.

Aircraft Calibration and Characterization

The spray aircraft was calibrated and characterized on Friday, April 28, at the Montgomery County Municipal Airpark. The aircraft and spray system wereinspected and three nozzles on each side of the boom were moved inboard so as to be within the circuit traveled by the rotating rotor blades. This was done to minimize the movement of spray material into the vortices created by the tips of the rotor blades and thereby minimize drift outside of the intended target area.

Following calibration, the aircraft was flown twice over separate card lines to check for uniform coverage and swath width. A 75 foot swath was accepted based on visual examination of the cards. Here are the specifics of the calibration:

Aircraft:	Bell 47G2A
Speed:	60 mph
Altitude:	30-50 feet above canopy
Swath width:	75 feet
Boom Pressure:	38 psi
Nozzles:	28-8003 Flat Fan (Stainless steel)
Orientation:	45 degrees forward
Application Rate:	1 gallon per acre
Coverage:	9.1 acres/minute
Flow Rate:	9.1 gallons/minute

MONITORING ACTIVITIES

Pre-Treatment Monitoring

On Saturday, April 29, a survey was conducted to evaluate larvae and foliage development at NSWC. The purpose of the survey was to determine the most opportune time to apply B.t. and Dimilin. Larval and foliage development at the time of the survey is presented in Example 3 and is summarized below.

April 29, 1989

Egg Hatch:	Completed
Larval Dispersal:	Completed
Larval Stage:	93 percent first instar
	7 percent second instar
Foliage Development:	30 percent - white oaks
	50 percent - red oaks
Other Observations:	Feeding activity present
	Majority of first instar larvae are in pre-molt condition

Operations Monitoring

The mixing and loading activities were monitored by the Forest Service. Detailed records (sortie reports) were kept (Example 1) showing gallons loaded into the aircraft, time of departure, time of return and acres treated. Periodic weather measurements were also recorded on the sortie reports. The actual application of the insecticide was monitored by Navy and Forest Service personnel on site in the treatment area. The monitors were responsible for observing and reporting any irregularities in the spray blocks, insecticide deposition, and treatment area demarcation.

Insecticide deposition was monitored using Ciba-Geigy water sensitive cards deployed in the treatment areas (Figure 1). Analysis of all of the deposit cards indicated the following:

(1) All of the cards within the treatment areas received some deposit suggesting that there was not any major skips in the application.

(2) Visual estimates of the drop size indicated that the spray system on the aircraft was producing the desired drop size (Volume Median Diameter of about 150 microns).

Post-Treatment Monitoring

An aerial defoliation survey using aerial sketch mapping techniques over the treatment and adjacent areas was conducted on June 23, 1989. Moderate defoliation (31-60 percent) was detected on approximately 13 acres within the NWSC treatment area. Approximately 11 acres of defoliation occurred in the Dimilin treatment area and 2 acres in the B.t. treatment area. Figure 2 shows the NSWC and the location of the defoliation. Egg mass surveys will be conducted in October to evaluate the treatment effects on reducing gypsy moth populations and whether treatment is needed again in 1990.

DISCUSSION

The project was successfully completed within the "biowindow" for B.t. and Dimilin. No major mishaps occurred and overall the operation went smoothly. Rain did occur in the area about 12 hours following treatment but the spray material had sufficient drying time to prevent any major wash-off. The availability of the LZ at ARS-Beltsville proved quite useful for both logistics and production purposes. Had we used the original staging area at College Park Airport, we would have had very limited communications between the LZ and treatment blocks and the increased ferry time would have slowed the treatment process considerably.

Although some moderate defoliation occurred at NSWC, much of it was adjacent to defoliated areas outside of NSWC and may have resulted due to larval migration from the untreated areas. Overall the treatment successfully prevented widespread defoliation and hopefully, this year's egg mass survey will show an reduced gypsy moth population as well.

Two recommendations are offered for future spray projects. 1. Provide an on-site staging area. This will improve production time and ease project management, but also provide a wider overall safety margin in terms of reducing airtime and flights over residential areas. 2. Prepare a formal project safety plan prior to treatment implementation. In light of the tragic helicopter crash that occurred this year during the State of Maryland's spray program, we all need to be more prepared to react to potential accidents.

The one element that is typically forgotten but undoubtedly contributed the most to the successful implementation of this project was the excellent cooperation, coordination and commitment exhibited by Dr. Thomas Wray II. Undoubtedly, Dr. Wray spent many hours in the preparation of the required environmental documentation and the planning for the treatment at White Oak NSWC. His efforts are greatly appreciated.

NAVAL SURFACE WARFARE CENTER

WHITE OAK LABORATORY

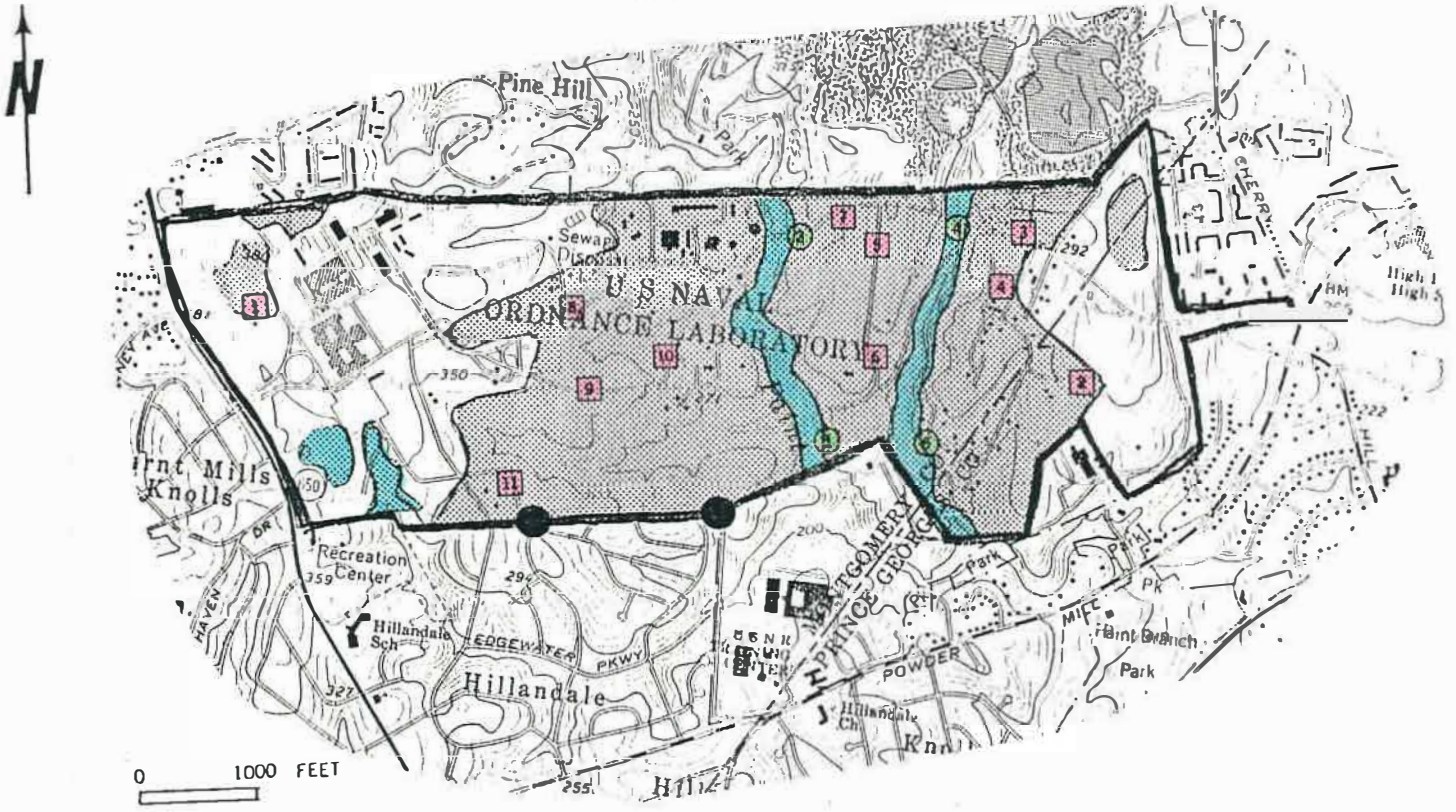


Figure 1.--Location of Treatment Area, Balloon Points and Card Lines. 1989 Gypsy Moth Suppression Program, Naval Surface Warfare Center.

Legend

=B.t. Treatment Area

=Dimilin Treatment Area

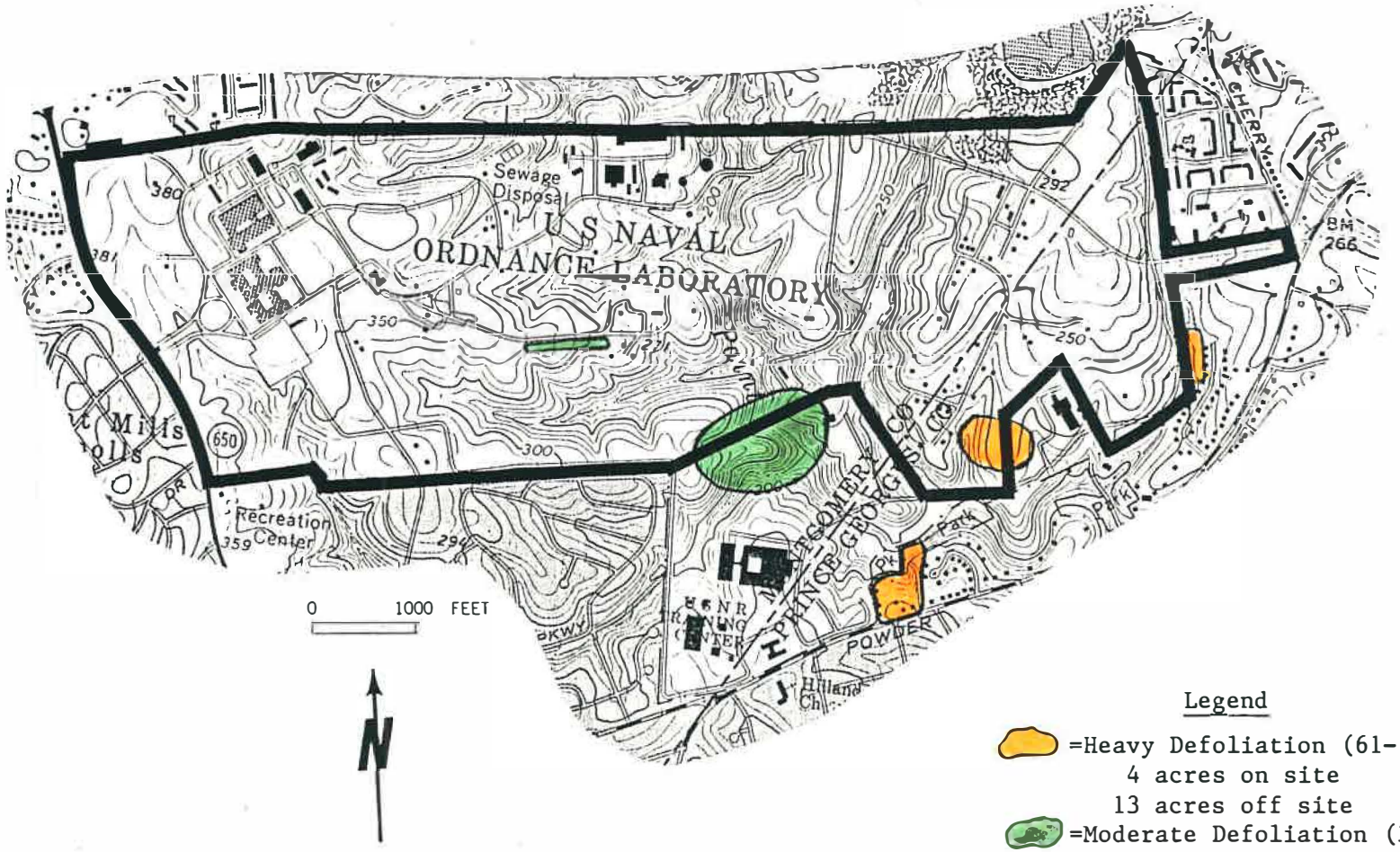
=Card Locations (B.t. Treatment Area)

=Card Locations (Dimilin Treatment Area)

=Balloon Points

Figure 2.--Results of Gypsy Moth Defoliation Survey. White Oak Naval Surface Warfare Center, June 28,1989.

NAVAL SURFACE WARFARE CENTER
WHITE OAK LABORATORY



Example #1

SORTIE REPORT

PROJECT: White Oak NSWC

DATE: 4/30/89

INSECTICIDE: Bt/Dimilin

AIRCRAFT: Bell 47 G2A

APPLICATION RATE: Bt - 1 gal/acre
Dimilin - 4 gal/acre

LOAD	TIME OUT	TIME IN	GALLONS	ACRES TREATED	COMMENTS
1	14:30	15:15	50	50	Bt. Completed
2	15:45	16:04	62.5	62.5	Dimilin
3	16:17	16:35	62.5	62.5	
4	16:49	17:08	62.5	62.5	
5	17:19	17:42	62.5	62.5	Dimilin completed

Total Acres Treated: Bt - 50 acres
Dimilin - 250 acres

WEATHER DATA

	WINDSPEED	WIND DIRECTION	RELATIVE HUMIDITY	TEMPERATURE	TIME
1.	0-2	SE	67%	77°	15:55
2.	0-2	SE	61%	76°	16:30
3.	0-2	SE	59%	75°	17:30

Example #2

AIRCRAFT CALIBRATION WORKSHEET

NAME: Brad/Rod

DATE: 4/28/89

Pilot - Dirk Decker
East Coast Helicopters

TRIAL # 1

AIRCRAFT: Bell 47G2A

FAA #: N8522F

APM: 2.09

GPM: 9.09

NOZZLE TYPE: 8003 Flat Fan

NO. OF NOZZLES: 28

ORIENTATION: 45° Forward

PRESSURE: 38psi

CALIBRATION TOLERANCE: ±5%

Swath - 75'
Spud - 60mph
App. Rate - 1 gal./acre

GALLONS IN PLANE: 10

CALCULATED TIME: 66 Sec.

ACTUAL TIME: 65

PERCENT DIFFERENCE: (Circle One)

(Faster) Equal Slower

IS FLOW RATE ACCEPTABLE (Circle One)

(Yes) No

If no, describe possible solutions:

within 2%

****

TRIAL # ____

AIRCRAFT: _____

FAA #: _____

APM: _____

GPM: _____

NOZZLE TYPE: _____

NO. OF NOZZLES: _____

ORIENTATION: _____

PRESSURE: _____

CALIBRATION TOLERANCE: + .5

GALLONS IN PLANE: _____

CALCULATED TIME: _____

ACTUAL TIME: _____

PERCENT DIFFERENCE: (Circle One)

Faster Equal Slower

IS FLOW RATE ACCEPTABLE (Circle One)

Yes No

If no, describe possible solutions:

_____

_____

Example #3

SITE: White Oak NSWC

DATE: 4/29/89

TRANSECT:

MONITOR: Rod/Brad/Tom

EGG HATCH?	(Y)	N
<50% HATCH	Y	N
>50% HATCH	(Y)	N

LARVAE DISPERSING?	Y	N
>50% LARVAE DISPERSED?	(Y)	N
<50% LARVAE DISPERSED?	Y	N
WHAT PERCENT AT 1st INSTAR? (count 100)	104 - 1sts (93%)	
WHAT PERCENT AT 2nd INSTAR? (count 100)	8 - 2nds (7%)	
WHAT PERCENT AT 3rd INSTAR? (count 100).		

PARASITISM?	Y	N
LIST PARASITES		
PREDATION?	Y	N
LIST PREDATORS		

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION <25%	25-50%	>50%
WHITE OAK				30%	
RED OAK					50%
OTHER					

COMMENTS Shot-hole defoliation present
Approximately 70% of 1st instar larvae are in pre-molting stage

United States Department of Agriculture
Forest Service
Northeastern Area State and Private Forestry
180 Canfield St.
Morgantown, WV 26505

Reply To: 3460

Date: July 18, 1989

Capt. Robert P. Fuscaldo
Commander
White Oak Naval Surface Warfare Center
Dahlgren, VA 22448

Dear Commander:

The enclosed report documents the on-site activities conducted during the 1989 gypsy moth suppression project at White Oak Naval Surface Warfare Center. The report describes the who, what, where, when, and how of the project. Two recommendations for future projects are also offered.

Three small areas of tree defoliation totaling 13 acres were detected on site during our June 23 aerial reconnaisance of the area. Further information is given in the report.

Please call Brad Onken or me if you have any questions (304-291-4133).

Sincerely,

NOEL F. SCHNEEBERGER
Entomologist
Forest Pest Management

cc: AO
Thomas Wray

BPO/mae

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